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ABSTRACT

During the spring 1992 term, James Monroe High School piloted Learning 100 On-Line, a remedial reading/literacy computer program developed by Educational Developmental Laboratories, Inc. The program, which was developed for junior high and high school students and adults reading at or below grade level, was implemented in two English-as-a-Second-Language, three Special Education, and four English classes. It is noted that Learning 100 On-Line is an integrated instruction and management system that diagnoses, prescribes, instructs, provides practice and reinforcement in, and evaluates mastery of reading, writing, vocabulary, and language competencies. It is noted further that it provides a multisensory, individualized approach which is designed to accommodate a variety of learning styles and educational backgrounds. An evaluation of the impact of the program on student attendance and academic achievement found the pilot to be successful on several levels. Several specific recommendations for schools that may wish to purchase the program are included. This report is presented in four sections: (1) Introduction--program background, evaluation methodology and scope of the report; (2) Program Implementation--use of the system, perceptions of the system and its strengths and weaknesses; (3) Student Outcomes--reading performance and attendance; and (4) Conclusions and Recommendations. Two tables present summaries of students' pre- and posttest scores on the reading comprehension subtest and spring 1992 percentage of attendance by group and gender. (ALF)

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OREA Report

Computer Pilot: Learning 100
On-Line System

1991-92

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Computer Pilot: Learning 100
On-Line System

1991-92

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5/92

EXECUTIVE SUMMARY

During the spring 1992 term, James Monroe High School piloted Learning 100 On-Line, a remedial reading/literacy computer program developed by Educational Developmental Laboratories, Inc. (E.D.L.). The program, which was developed specifically for junior high, and high school students and adults who are reading at or below grade level, was implemented in two English as a Second Language, three Special Education, and four English classes.

The pilot was successful on several levels. Teachers' reports of high student enthusiasm were supported by statistically significant gains in reading and good attendance achieved by students participating in the pilot. Students themselves agreed that working on the computer was especially helpful, more interesting than learning in a more traditional format, and fun.

The biggest obstacle to successful program implementation encountered by school staff related to an inadequate amount of computer memory in the school's equipment, rather than to difficulties with a particular aspect of the Learning 100 On-Line system.

Based on the findings of the evaluation, OREA makes the following specific recommendations to schools if administrators decide to purchase the program:

- School staff should work with the superintendent's office to expand computer network capabilities to accommodate more levels of Learning 100 On-Line, so that all students are able to profit from using the system at the most appropriate level.

- Central, district, and school staff should work together to insure that hardware specifications meet software program needs in schools purchasing the program.

- School administrators should explore possibilities for making the computer lab more accessible for teachers to use throughout the school day, so that they can take advantage of the many aspects of the management system that they currently have little opportunity to use.

- School administrators should facilitate meetings for the English, Special Education, and E.S.L. departments so that they may share ideas, discuss problems, and evaluate the program throughout the year.

- School administrators purchasing the system are encouraged to provide teachers with professional development to facilitate efficient use of the system.

ACKNOWLEDGEMENTS

This report has been prepared by the High School Evaluation Unit, Office of Research, Evaluation, and Assessment (OREA), of the New York City Board of Education. Dr. Lori Mei, Evaluation Manager, supervised the study and preparation of this report. Mattie Bialer, evaluation consultant, coordinated the project, conducted interviews and prepared this report. Thanks also to Sally Renfro and Ann Marie White for analyses of the reading data.

Additional copies of this report are available by writing to:

Dr. Lori Mei
Office of Research, Evaluation, and Assessment
110 Livingston Street, Room 740
Brooklyn, New York 11201

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I. INTRODUCTION

PROGRAM BACKGROUND AND STRUCTURE

The Division of Instruction and Professional Development's (D.I.P.D.) Office of Computer Resource Services (now a part of D.I.P.D.) is charged with the responsibility of approving network managed Integrated Learning Systems (I.L.S.). As part of this responsibility, D.I.P.D. requires vendors who wish to sell I.L.S.s to New York City Public Schools to pilot their software in a school for one or two terms in order to assess the efficacy of the I.L.S. on student attendance and achievement outcomes. The Office of Research, Evaluation, and Assessment (OREA) is responsible for evaluating the computer pilots and assessed the impact of Learning On-Line at James Monroe High School during the spring 1992 term.

Learning 100 On-Line is a remedial reading/literacy computer program developed by Educational Developmental Laboratories, Inc. (E.D.L.). The program, which was developed specifically for junior high and high school students and adults who are reading at or below grade level, was implemented in two English as a Second Language (E.S.L.), three Special Education, and four English classes.

Learning 100 On-Line is an integrated instruction and management system which diagnoses, prescribes, instructs, provides practice and reinforcement in, and evaluates mastery of reading, writing, vocabulary, and language competencies. Through the use of the computer, Learning 100 On-Line provides a multisensory, individualized approach which is designed to

accommodate a variety of learning styles and educational backgrounds.

The program is divided into nine reading levels ranging from first through tenth grades (Levels AA through IA). Each level is divided into 20 to 30 carefully planned sequences of learning activities called Cycles of Instruction.

Learning 100 On-Line is an open entry/open exit program which is well suited for use with students with inconsistent attendance patterns. It keeps track of each student's lesson progression, and begins instruction exactly where he/she leaves off. Students are not in competition with their classmates and are able to enjoy a sense of confidentiality using the system. Repetition is designed into the sequence of learning experiences. It is also integrated into the curriculum by using a combination of audio and visual stimuli to repeat every vocabulary word in many contexts, exercises, and learning modes.

Diagnosis and Placement

A student's entry level into Learning 100 On-Line is determined by a series of cloze format vocabulary tests. The student is placed at the lowest level at which he/she demonstrates nonmastery of the vocabulary. Once placement has been determined, the student is given criterion-referenced tests, so that instruction can be concentrated on the reading comprehension skills, taught in each cycle, in which the student demonstrates weakness. Nonmastery of a skill will result in a prescription to receive instruction in that skill, while

demonstrated mastery exempts the student from instruction in that specific skill of the cycle.

The Management System

The computer management system evaluates and records data on student progress at each step in the instructional sequence. At selected points this evaluation will either move the student to the next lesson, or "recycle" him/her through the same set of skills or concepts at a lower reading level, repeating concepts at ever decreasing reading levels until mastery of the concept is achieved. It then moves the student back up, having him/her apply this skill at gradually increasing reading levels so that mastery is not lost as the student moves back to his/her instructional reading level.

In addition to monitoring student progress, Learning 100 On-Line provides the teacher with an easy-to-use, menu-driven system designed to manage the complex delivery of instruction. It enables the teacher to track each student's progress from the teacher's computer station. It provides information on which questions in each lesson were answered correctly or incorrectly, whether the student's overall performance for that lesson was at a mastery level, how much total time he/she has spent on the computer, and his/her reading speed. When a student does not master a lesson, a message, which may include a prescription for additional instruction, is sent to the instructor.

The management system also generates reports which provide information for students, teachers, and administrators including test analyses, prescriptions, lesson performance data, student history information, and class enrollment summaries.

To supplement the computer program, E.D.L. provides print material and audio cassettes for student use.

EVALUATION METHODOLOGY

The Division of Computer Information Services' (D.C.I.S.) Office of Computer Resource Services* requested that the Office of Research, Evaluation, and Assessment (OREA) evaluate the efficacy of Learning 100 On-Line Pilot at James Monroe High School. The D.C.I.S. was interested in determining whether the program had a positive impact on student achievement, as measured by both anecdotal information about program success, and by a quantitative examination of students' reading improvement during the spring 1992 term--the term in which the pilot was in effect.

Qualitative data included interviews with the six teachers administering the program at James Monroe, and with the assistant principals of the English as a Second Language, Special Education, and English departments. Interviews focused on students' academic needs and interests, the appropriateness of the system for students, perceived program strengths and weaknesses, and suggestions for improvement. The evaluator also spoke with nine students participating in Learning 100 On-Line about what they liked and disliked about the system, and whether the program helped them in any way.

OREA's quantitative evaluation of the program included analyses of reading test scores, attendance, and the amount of

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*This office has subsequently been transferred to the Division of Instruction and Professional Development.

time students spent using the system ("time on system"). Pre- and posttest scores on the comprehension subtest of the Stanford Diagnostic Reading Test (3rd Edition, Green Level, Form G) were used to measure reading progress. Evaluators selected this test as the most appropriate instrument available to measure reading progress in the Special Education and limited English proficient (LEP) students who participated in the pilot.* OREA administered the comprehension subtest to students at the beginning and again at the end of the spring 1992 term, and also used central files to compare the spring 1992 attendance of students in the pilot with their attendance during the previous spring (spring 1991).

The total amount of time students spent working on the computer was then compared with students' scores on the reading comprehension subtest to determine whether there was a relationship between the amount of time students spent working on the system and their performance on the reading test.

SCOPE OF THIS REPORT

Chapter II summarizes staff and student comments about their use of the system, as well as their perceptions of the program's strengths and weakness. Analyses of reading scores and attendance are provided in Chapter III, while Chapter IV presents OREA's conclusions about and recommendations for the program.

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*One of the three Special Education classes was included in the pilot but did not participate in the testing.

II. PROGRAM IMPLEMENTATION

USE OF THE SYSTEM

The Components of the Learning 100 On-Line system are interrelated. Each lesson in the system contains a vocabulary (Language Clues), comprehension (Reading Strategies and Thinking Strategies), and writing (Write and Read, and Writing Strategies) segment. New vocabulary is introduced through an audio/visual presentation. The vocabulary words are then used to teach reading and listening comprehension skills. These skills are in turn reinforced by creative writing lessons and lessons in grammar, mechanics, usage, and the process of writing compositions. At the end of a cycle students enjoy recreational reading (Go Books) which incorporate the vocabulary which has been taught and reinforced throughout the cycle.

Two English as a Second Language classes, three Special Education classes, and four English classes, taught by two teachers from each department, participated in the Learning 100 On-Line pilot program during the spring 1992 term. Students in the English and E.S.L. classes used the computer lab three times per week, and worked in their classrooms on other aspects of the curriculum during the remaining two days.

The Special Education classes also used the lab two to three times per week, although they had initially used the program five periods weekly. Special Education teachers reduced the number of days in the lab when it became apparent that the level of the system was too difficult for many students, who became

frustrated. One Special Education teacher opted to eliminate the Reading Strategies segment of the program to avoid this problem, and used only vocabulary lessons for students who tested below the level at which they were operating. This same teacher was especially enthusiastic about the system's writing component, however, noting that students' increased confidence in their ability to write was apparent in the increased length of their written work. Special Education teachers encouraged students who were unable to write their own stories to dictate them to the paraprofessional.

The E.S.L. Department piloted Learning 100 On-Line with their highest level (7 and 8) students because staff considered the system too difficult for less advanced students. However, a teacher commented that, "there are endless opportunities for E.S.L. [students to use this program] on lower levels."

PERCEPTIONS OF THE SYSTEM

Teachers' Attitudes

In general, the teaching staff expressed approval of the system. The English teachers and the assistant principal of the English department believed that the program provided students with good preparation for Regents Competency Tests.* The assistant principal for Special Education found the program to be "very important for learning disabled students," and expressed an interest in expanding the base of Special Education teachers who

*Regents Competency Tests (R.C.T.s) are minimum competency tests in several subject areas that students must pass prior to receiving their high school diploma.

are trained in the use of the system. Teachers from both the English and the E.S.L. departments noted, however, that two days per week in the classroom is not a large enough block of time in which to adequately develop other aspects of the curriculum. Conversely, they wished that they had more time to supplement the computer lab work in class.

Students' Attitudes

Teachers reported a generally high level of enthusiasm for the program among students who were working at their appropriate level. The CREA evaluator observed that most students turned on their computer immediately upon entering the lab, and began working on their lessons before the teacher came in. When asked what they liked about Learning 100 On-Line, several students mentioned the multi-sensory approach as being especially helpful. "You can concentrate a lot. Instead of using your mouth, you can use your fingers," one said. "It shows you more than talking. It makes things more interesting and fun," commented another. An E.S.L. student observed that "Listening and writing words helped me learn them. I have many friends who need help in English. This program is the answer." Other comments included, "I like computers. They're cool," "It lets you practice," "I learned how to understand what I am reading," and "The computer helps me out. It shows me what I get wrong."

Of course, students' comments raise the question of whether Learning on-Line 100 is successful because of its software or merely because students enjoy working on a computer. Subsequent

evaluations of computer pilot programs should address this question more fully.

PROGRAM STRENGTHS

Teachers and administrators' comments about the strengths of Learning 100 On-Line centered around students' motivation and attitudes, praise for individual components of the system, and teacher support engendered as a result of the system. Staff agreed that students enjoyed working on the system and were developing positive attitudes toward computers and greater ease in using them. They singled out the individualized nature of the program (which allowed for a wide range of reading and writing levels), the varied exercises (which minimized student boredom), the dictionary, the management system (which enabled students to monitor their progress) and interesting subject matter and writing assignments as particular program strengths. Finally, teachers and administrators praised the thoroughness of the staff training provided by E.D.L., and the establishment of a cross-departmental faculty support group, as important outgrowths of their experience with the system.

PROGRAM WEAKNESSES

The biggest problem that staff encountered in implementing the Learning 100 On-Line system was the fact that their computer network's memory could not accommodate all of the levels that students needed.* Staff initiated the pilot with levels

*According to central staff, the additional memory was not invested in because of the pilot nature of the program. However, hardware specifications will be clear and purchased for schools purchasing the system in the future.

applicable to students reading between the third and the seventh grade levels (Levels CA through FA), with the understanding that the Bronx superintendent's office would facilitate upgrading their computer capabilities to allow for the addition of the lower levels (AA, and BA) which some of their students required.

This upgrade was not in place by the end of the school year. Consequently, 35 students who tested as reading below the third grade level were required to work one or two levels above their prescribed placement. In addition, the appropriate level was not available for students who placed at the CA level or above, but who, because of nonmastery of a skill, were referred back by the management system to a lower level. In an interim attempt to address this need, the E.D.L. representative suggested that teachers supplement instruction at the CA level with print and audio cassette materials geared toward the lower levels (AA, BA).

In addition, teachers in the program had limited access to the computer room during periods when they were not teaching. This limited access reduced the amount of time available to the teachers to work with the various reports that are designed to assist them in the instructional process. There also appeared to be some difficulty in obtaining assistance when problems arose with the system. According to some teachers, the computer coordinator, who was responsible for other computer rooms, was not sufficiently knowledgeable about the program to be able to address specific problems. Teachers saw a need for someone to be available to provide immediate information or help.

Staff generated several suggestions to improve the program. E.S.L. teachers believed that the system would be improved for their students if an audio-lingual component, directed specifically at limited English proficient students, were included. The E.S.L. assistant principal suggested that program material be revised to include topics of particular interest to a Latin American or Haitian student population, as well as topics emphasizing career awareness. Other suggestions included lessening the system's reliance on male-oriented stories,* expanding the audio component throughout lessons rather than just at the beginning of a lesson, and providing more screen space for the writing component.

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*Program staff reviewed the entire Learning 100 On-Line curriculum to ascertain whether there was, in fact, an overabundance of male-oriented stories. This was not found to be the case. E.D.L. staff suggested that the teachers who believed that there were more male-oriented stories may have been working with only a portion of the curriculum.

III. STUDENT OUTCOMES

READING PERFORMANCE

Complete pretest and posttest reading score information was available for 55 students who participated in the pilot program. Raw scores on the reading comprehension subtest were converted to normal curve equivalent scores (N.C.E.s)* by hand, using a conversion manual obtained from the test publisher. According to these data, students gained an average of 8.5 N.C.E. units from the pretest to the posttest. This gain was statistically significant (t=5.4; df=1,54; p<.01) indicating that students' reading comprehension was meaningfully improved from the beginning to the end of the pilot.

Further analyses of test scores by gender (female/male) as well as by type of student (English as a Second Language, Special Education, General Education) were extremely positive and are reported in Table 1. As shown in this table, on average, the reading scores of students in E.S.L. classes, special education students, and students in English classes all improved between 3 and 14 N.C.E. units. Such a consistent pattern of gains in

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*A normal curve equivalent (N.C.E.) score is similar to a percentile rank, but is based on an equal-interval scale ranging from 1-99, with a mean of 50 and a standard deviation of 21. Because N.C.E. scores are equally spaced, arithmetic and statistical calculations such as averages are meaningful, and comparisons of these scores can be made across different achievement tests. A gain in N.C.E. units from pretest to posttest indicates that a student's performance is better than what would be expected by normal growth and chance.

Table 1

Summary of Students' Pretest and Posttest Scores on the Reading Comprehension Subtest, in Normal Curve Equivalents

Group	N	Pretest Mean	Pretest S.D.	Posttest Mean	Posttest S.D.	Mean Difference
E.S.L. Female	13	10.22	11.70	13.50	15.63	3.28
E.S.L. Male	12	17.56	11.12	24.03	14.18	6.48
Special Ed. Female	4	2.43	2.85	10.28	9.32	7.85
Special Ed. Male	5	1.00	.00	12.64	18.04	11.64
General Education Female	8	15.70	12.08	23.63	15.36	7.93
General Education Male	13	20.22	13.21	35.11	15.25	14.89
Total	55	13.58	12.45	22.06	16.88	8.49[a]

[a]This difference was statistically significant (t=5.42; df=1.54, $p<.01$).

- Overall, students' reading comprehension improved from the beginning to the end of the pilot.

students who might be expected to have some difficulty with reading comprehension speaks very positively for the program.

Interestingly, a very low correlation (r=.13) was found between time on the system and posttest gain. This low correlation suggests that there is very little relationship between the amount of time students spent using Learning 100 On-Line and their test scores. Perhaps this finding can be better understood in light of students' comments indicating that they enjoyed working on the computer, and the evaluator's observation that students' appeared self-motivated when using the system. It may be that giving students the opportunity to work on a computer *per se* motivates students to make measurable progress in reading, and that this motivation is not tied to a specific amount of time they spend on any particular computer system.

ATTENDANCE

OREA also calculated the spring 1992 attendance of students in the pilot. Complete data were available for a total of 119 students. According to these data, and as shown in Table 2, students in the pilot had a spring 1992 attendance rate of 78.0 percent overall. E.S.L. students' attendance was highest at 87.4 percent followed by a 75.6 percent attendance rate among General Education students in the pilot and a 70.1 percent rate for Special Education students. In general, there were slight differences in the attendance of students by gender: on average, the attendance of boys was slightly higher than that of girls. Interestingly, the average attendance of pilot students was very

Table 2

Summary of Spring 1992 Percentage Attendance
by Group and Gender

Group	Female	Male	Combined
E.S.L.	86.9	88.0	87.4
Special Education	73.8	68.6	70.1
General Education	68.0	82.1	75.6
Total	76.4	79.3	78.0

- Attendance varied slightly by group and gender. Overall, girls attended class slightly less often than did boys.
- E.S.L. students had the highest attendance of any of the groups.

similar (78.0 percent) to the percentage reported for all of James Monroe High School (78.5 percent) during the spring 1992 term by the Division of High Schools on Period Attendance Reports (PARs).

IV. CONCLUSIONS AND RECOMMENDATIONS

The spring 1992 pilot of the Learning 100 On-Line system at James Monroe High School was successful on several levels. Teachers' reports of high student enthusiasm were supported by statistically significant gains in reading and good attendance achieved by the special education, general education, and limited English proficient students who participated in the pilot. Students themselves agreed that working on the computer was especially helpful, more interesting than learning in a more traditional format, and fun.

The biggest obstacle to successful program implementation encountered by school staff related to an inadequate amount of computer memory in the school's equipment, rather than to difficulties with a particular aspect of the Learning 100 On-Line system.

Based on the findings of the evaluation, OREA makes the following specific recommendations to schools if administrators decide to purchase the program:

- School staff should work with the superintendent's office to expand computer network capabilities to accommodate more levels of Learning 100 On-Line, so that all students are able to profit from using the system at the most appropriate level.
- Central, district, and school staff should work together to insure that hardware specifications meet software program needs in schools purchasing the program.
- School administrators should explore possibilities for making the computer lab more accessible for teachers to use throughout the school day, so that they can take advantage of the many aspects of the management system that they currently have little opportunity to use.

- School administrators should facilitate meetings for the English, Special Education, and E.S.L. departments so that they may share ideas, discuss problems, and evaluate the program throughout the year.

- School administrators purchasing the system are encouraged to provide teachers with professional development to facilitate efficient use of the system.